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AUTHOR Tinning, Richard I.
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ABSTRACT

A review is presented of research concerning physical education instruction, focusing upon those studies which use interaction analysis as a method of systematically observing the instructional process. A brief overview of the development of interaction analysis systems in physical education cites instruments which were designed for focusing on classroom teaching, e.g., Cheffer's Adaption of the Flanders Interaction Analysis System (CAFIAS), and adaptations of generic systems such as Olson's modification of the Observational System for Instructional Analysis (OSIA). Other systems which have also provided basic research tools for studies are included in the overview. A discussion is offered on the uses of these instruments in describing instructional processes and determining behavior patterns in teaching. Findings of contemporary studies on the issue of effective teaching behaviors are summarized. A discussion is presented on the use of interaction analysis in changing teacher behaviors. A list of 44 references is included. (JD)

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The use of interaction analysis in describing instructional processes in physical education.

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Richard I. Tinning
School of Education
Deakin University
Geelong, Victoria 3217
Australia

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Discussion concerning what physical education teachers do in the gymnasium or on the playing field to arrange the material, human and temporal resources to accomplish curriculum goals and objectives is not new. Physical education writings have long carried opinions and prescriptions regarding which instructional processes are appropriate in physical activity settings. Books on teaching method (a term used synonymously with instructional processes in many physical education writings) such as the seminal text by Bilbrough and Jones (1972) have advocated how instructional processes should be organized.

Advocacy tends to be polarized. On one side are those who support a form of instruction that is characterized by teacher control, organizational efficiency, and conformity of student responses (see Hoffman, 1971 and Willee, 1978) and on the other side are advocates of instructional processes which are less teacher controlled and which attempt to maximize individual differences in student response (see Tanner and Barrett, 1975). Others like Mosston (1966) have argued a case for a number of teaching 'styles' (synonymous with method or instructional process) which can be implemented for different learning outcomes. Although description of 'styles' vary between authors they do however, share a common characteristic; each is based on personal conviction unsupported by any research based on systematic observation of teaching.

This is not to say that physical education teaching has not been the focus of research. In fact there are numerous examples of what Nixon and Locke (1973) termed 'methods research' in which attempts were made to test the superiority of one teaching method

compared to another. However with the exception of Dougherty's (1970) study all such 'methods research' failed to systematically observe what teachers and pupils actually did during the instructional session(s). Researchers assumed that when teachers were 'arranged' to teach by means of a particular instructional method that they in fact did so. It was assumed that teachers and pupils behaved in ways that were typical of the conventional wisdom regarding a particular methodology. In other words when an attempt was made to compare the effectiveness of the 'Direct Method' and the 'Indirect Method' (Bilbrough and Jones, 1972 terms) there was no systematic observation of instruction in order to determine whether or not teachers and pupils were behaving in accord with the behavior purportedly characterizing each training method. Excellent criticism of the research methodology employed in 'methods research' is provided by Locke (1977) and Cooper (1977).

It was Locke's (1977) contention that descriptions of practice which are not based on direct observation of the practice itself can only be impotent in their application to practice. According to Locke, attempts to understand the process of instruction in physical education classes has been disabled by regarding the gymnasium as a 'black box'.

> "If teacher behavior is thought to be a factor of importance in determining the production of educational outcomes, then there is only one way to study it and only one place to study it. That way is by observing teaching directly where it occurs, in the place where the action is, inside the black box." (p. 10)

One particularly useful research tool which enables objective records of what goes on within instructional sessions is interaction analysis. What follows is an attempt to review the contemporary research into physical education instruction. Focus will be only

on those studies which use interaction analysis as a method of systematically observing the instructional process.

Most contemporary research into physical education instruction can be seen as applications of the Dunkin and Biddle (1974) model for studying teacher effectiveness. While it is true that a number of process/product studies had their origins before the publication of the model, the model afforded a common terminology and conceptual framework for discussing research into teaching.

The development of interaction analysis systems in physical education.

Eminating from a view of the world which favors quantitative data, a number of coding systems were developed which were intended to capture (record) a part of the reality of the instructional process. Some of these systems were hybrids of interaction analysis systems which were designed for focusing on classroom teaching. Cheffers (1972) adapted the Flanders (1970) system for use in movement classes and his CAFIAS (Cheffer's Adaption of the Flanders Interaction Analysis System) has been used in many studies into teacher/pupil interaction, the results of which will be discussed later in this paper. Other less used adaptations of generic systems include Olson's (1979) modification of the Observational System for Instructional Analysis (OSIA) (see Hough, 1980) and Gasson's (1971) modification of the Flanders system.

Systems were also developed which used systems of interaction analysis which were different in kind from Flanders. Laubach (1975) developed the BESTPED system (An acronum for Behavior of Students in Physical Education) which records student behavior. Anderson's (1974) descriptive system was guided by the intent to produce a professionally meaningful description of teacher behavior. Fishman (1974)

developed a system for recording how teachers provide augmented feedback in physical education classes. Barrett's (1969) system described teacher/student behavior in primary physical education lessons implementing the concept of movement education, and Taylor (1976) developed an instrument for rating patterns of teacher behaviors in relationship to student achievement. Hurwitz (1975) focused his system on describing certain aspects of the physical education teacher's role in the learning-activity process. Hupe (1974) and Showers (1974) also developed procedures for coding teacher behavior in physical education classes.

These systems for systematically recording forms of interaction within physical education classes have provided the basic research tools for many of the descriptive studies which address the question of "what's going on in the gym?" Clearly there is a large number of instruments (many were not included because they were considered to be systematic observation systems but not concerned directly with interaction analysis) and Locke (1977) issues a caution with respect to endless proliferation of instruments,

> "If an extant instrument will work for a given purpose it should be used in preference to the development of a new instrument." (p. 12)

Descriptions of instructional processes.

All of the instruments developed to facilitate the recording of behaviors in physical education settings have not been successful in terms of continued application. Many were developed and used as 'one-off' doctoral dissertations. Others such as CAFIAS have had repeated applications in numerous settings and have accordingly been continually refined. However even the instruments/systems which have had limited generalized use have contributed valuable information

regarding instruction within physical education. Although cognizant of Locke's warning regarding proliferation most of the instruments cited above were frontrunners of the systematic observation movement within physical education and as such fulfilled a valuable function.

Using the observation system developed by Flanders , Nygaard (1971), reported findings which formed the beginning of a relatively consistent emerging pattern of the teaching of physical educators. Nygaard found that physical education teachers placed great emphasis on content; viewed themselves as authority figures; did most of the talking in class and such verbal behaviors had a 'direct' influence on students. 'Direct' refers to the Flanders categorizations of lecturing, giving directions, criticizing or justifying authority behaviors.[1]

That same year (1971), a project began at Teachers College, Columbia University under the direction of Professor W. G. Anderson which was to provide valuable data for describing physical education teaching. The Videotape Data Bank, as the project became known, included the videotaping of 83 individual physical education lessons which were to provide the basis for the development and trialing of observation instruments/systems by Anderson (1974), Fishman (1974) and Laubach (1975), as well as for a number of subsequent descriptive studies using those instruments.

Using Anderson's (1974) instrument, Barrette (1974) focused his attention on the teaching behavior exhibited by teachers in 40 lessons from the Videotape Data Bank. Among other things, Barrette found that over 94 percent of total class time was spent in interaction and that almost 77 percent of time was spent preparing

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[1]This meaning of Direct should not be confused with 'Direct Method' as conceived by Bilbrough & Jones (1972) or Willee's (1978) 'Directive Methods'.

for, guiding and observing movement. Teachers were seen to be doers and talkers and only small differences were evident between the elementary and secondary school lessons. Costello (1977) used the Laubach BESTPED system to record the pupil behavior of 193 elementary students from 20 classes in the Video Data Bank and found that they spent 63 percent of the time they were observed involved in non-movement behavior. In other words only 37 percent of physical education lesson time was spent in movement. Furthermore only 27 percent of their time was spent in movement which was related to the lesson objectives. Some 35 percent of the time was spent waiting and 25 percent receiving information.

The most comprehensive single study of the teaching recorded in the Video Data Bank was conducted by Cheffers and Mancini (1978). Using CAFIAS to record teacher/pupil interaction, Cheffers and Mancini viewed all 83 lessons in the Data Bank and found minimal differences between male and female teachers and between elementary and secondary levels of teaching. Teachers used lecture, demonstration and direction-giving as the predominant tactics in instruction. Use of punishment and correction was minimal and there was virtually no evidence of teacher acceptance of student feelings and ideas, little praise and few questions.

In a subsequent study Lombardo and Cheffers (1979) used CAFIAS to observe the daily teaching behavior of four physical education teachers for a period of two months. They found that teaching behaviors remained stable over time and commented that:

> "It appears that the physical educators surveyed adopted remarkably similar patterns of behavior which could be described as teacher dominated, lacking in comfort and praise, and devoid of that ultimate scholarly methodology, the question." (p. 4)

The patterns of teacher behavior identified in 1971 by Nygaard

were still obvious.

Again using CAFIAS, Lombardo (1979) found that even across different content areas like team sports, individual and dual sports, and movement education, teachers exhibited similar patterns of behavior. Although there were small variations in the use of questioning (in team sports), praise (individual and dual sports), and pupil initiated activity (movement education), the dominant behavior across all areas were extended teacher talk, direction giving followed by narrow predictable student response.

In a critique of traditional teaching methodology in physical education, Hoffman (1971) argued that emphasis in physical education classes was placed on 'delivery of the message, organizational efficiency, neatness and order, discipline and control and skill analysis'. Hoffman's description of the fundamental hallmarks of teacher instructional behavior has subsequently been shown by empirical investigation to be remarkably true to reality. Hoffman contends that such methodology in physical education

> "...has its basis not in science or even theory, but in the unglamorous realities of life." (p. 12)

It must however be remembered that criticism of an instructional strategy needs to relate process to product in order to answer the key question - do the instructional processes facilitate the acquisition of desired goals or objectives? For example, research by Thaxton et al (1977) and Dougherty (1970) has shown that the traditional teaching method (Bilbrough and Jones' 'Direct Method') is most effective for producing pupil achievement in fitness and motor skill learning. Although appealing arguments may be presented which challenge the implicit curriculum of such instructional processes, the universality of the traditional method might be entirely appropriate were the sole objectives of physical education

the development of fitness and motor skills. However the appropriateness of such a methodology for the development of objectives related to self-expression, creativity, independence, enjoyment and movement understanding remains problematic.

The extent to which some of the findings related to teaching behavior patterns are actually artifacts of the particular interaction analysis systems used to record behavior should also be regarded as problematic. There is, for example, at least some conflicting evidence from Rushall and Richards (1981) that teachers do not display patterns of behavior that could be likened to a particular teaching style. Using observation schedules developed by Rushall (1977) they found that consistent teaching patterns were not evident over time. It is too early to 'close the book' on descriptive research into the teaching behaviors within physical education classes. Much more needs to be known not only about what teachers and pupils do in the gymnasium but also what are the effects of what they do.

What behaviors are most effective? The issue of teaching effectiveness.

Historically attempts to answer this question within physical education have been plagued with the same methodological shortcomings as similar efforts within the wider field of education. Early emphasis on the relationship between the presage and/or context variables and pupil achievement were largely unproductive because they failed to consider the nature of the process variables. An account of the many attempts to investigate teaching effectiveness without directly observing the instructional process is outside the scope of this paper however a brief mention will be given of three contemporary studies which have incorporated such direct observation

of teaching.

According to Locke (1979), research into teaching effectiveness (RTE) requires at least a measure of process variables (e.g., a record of teacher behaviors during class) and a good measure of pupil achievement. Possibly the first attempt within a physical education context to implement an RTE model, in the Locke sense of the phrase, was the study by Dougherty (1970) into the effects of different teaching styles on the development of physical fitness and motor skills. Although lacking the sophistication which would be desirable for unequivocal support for a functional relationship between teaching method and pupil achievement Dougherty did use systematic observation of the teacher and class 'in action' (using a modified Flanders system) and a measure of pupil achievement (fitness tests and motor skills tests). Thus process and product measures were included and the results (within the limitations mentioned above) tended to offer conformation of the conventional wisdom relating to teaching style and the development of fitness and motor skills.

In 1979, Yerg made an attempt to answer the question "what is it that effective physical education teachers do?" by recording presage and process data and a permanent measure of pupil achievement (a videotape of a performance of a motor skill). Yerg failed to attribute changes in pupil achievement to any of the 5 presage and process variables measured. The factors which accounted for the .23 percent of variance not predicted by initial student achievement were unexplained. However in a subsequent study of the Yerg 1977 data, Sherman and Yerg (1979) found that the number of practice trials had a significant correlation with learning and that those

teacher behaviors which served to reduce practice time had a negative effect on achievement. Teacher talk (including verbal feedback) also has the same effect as other practice limiting teacher behaviors.

Grant (1980) also employed interaction analysis to address the question of teaching effectiveness in physical education however his criterion measure (dependent variable) was judges' ratings of teacher effectiveness rather than a measure of pupil achievement. Although not strictly an RTE study, in the Locke sense of the term, Grant's study was significant because it addressed the question of teaching effectiveness by means of direct systematic observation of the instructional process. Using the observation system developed by Gasson (1971) Grant compared the patterns of teacher and pupil behaviors made by student teachers considered by the panel of judges to be most effective and least effective. The results revealed that those considered most effective displayed more versatile behavior patterns and had their class engaged in on-task behaviors for three times the length of time as did the least effective student teachers. Grant's study provided further support for the claim made by Hoffman (1971) and others that the dominant sequential pattern of behaviors in physical education classes is 'teacher talk-student listen-student move-teacher watch'. The fact that such patterns of behaviors are evident even within student teachers stimulates questions concerning the influence of previous teacher role models and the capacity of teacher training programs to modify such behaviors change is considered desirable.

The use of Interaction Analysis in changing teacher behaviors.

Although the answers to questions relating to teaching effectiveness in physical education are still equivocal, attempts have

been made to change (improve) teacher behavior by means of consideration and analysis of data collected on instruction processes. Interaction analysis systems provided a major form of data collection and analysis for many such research projects.

Studies by Hendrickson et al (1976), Rochester et al (1977), Mancini et al (1978), and Van de Mar et al (1981) have all essentially confirmed that student teachers and practicing teachers can change their teaching behaviors given adequate information about their teaching, and that such useful information can be obtained by using interaction analysis.

As a method of systematic observation, Interactive Analysis is not without its critics (see for example Rosenshine (1970) and Delemont (1976)) however the fact remains that teachers and student teachers can and do find it more useful in obtaining a more objective description of what goes on in their classes. The use of Interactive Analysis in inservice programs like those described by Cheffers and Mancini (1979) would seem to have considerable potential in helping teachers understand and improve their own instructional effectiveness.

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